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Post-Pandemic Physical Activity Patterns among Adolescents: A Comparative Study in Haryana

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ABSTRACT

The COVID-19 pandemic profoundly impacted adolescent health behaviours, especially physical activity patterns. This study investigates and compares post-pandemic physical activity trends among adolescents in Haryana's urban and rural regions. A total of 500 adolescents (250 urban and 250 rural, aged 12–18 years) were surveyed using structured questionnaires based on the WHO Global Physical Activity Questionnaire (GPAQ), complemented by focus group discussions with students, parents, and physical education teachers. Findings reveal a significant decline in overall physical activity levels post-pandemic, with urban adolescents showing a sharper reduction compared to their rural counterparts. Urban participants reported increased screen time, limited access to outdoor spaces, and decreased engagement in school-based physical education. Conversely, rural adolescents maintained relatively better activity levels, aided by continued participation in outdoor chores and traditional games. Gender disparities were also evident, with girls—particularly in urban areas—exhibiting lower activity levels due to household responsibilities and social restrictions. Qualitative insights further highlighted the lack of structured post-pandemic physical activity initiatives in schools and communities, particularly in urban settings. The data underscore the urgent need for targeted interventions, including school-led PE programs, gender-inclusive sports opportunities, and parental awareness campaigns to combat rising sedentary behaviours. This comparative analysis not only reveals critical regional and gender-based disparities but also provides actionable insights for policymakers, educators, and public health practitioners working to restore and promote active lifestyles among adolescents in a post-pandemic landscape.

Introduction

The outbreak of the COVID-19 pandemic in early 2020 brought about a global health crisis that dramatically disrupted everyday life, with one of the most affected groups being adolescents. With strict lockdowns, prolonged school closures, limited access to public spaces, and the transition to digital modes of learning and communication, the daily routines of adolescents were significantly altered. Among the various behavioural changes observed, one of the most critical and concerning was the decline in physical activity levels.

Adolescence is a crucial stage of human development marked by rapid physical, emotional, and social changes. However, the restrictive measures imposed during the pandemic created barriers to achieving these recommendations.

The closure of schools - often the primary environment for organized physical activity - along with the closure of parks, gyms, and recreational centres, severely curtailed opportunities for movement and exercise.

In the Indian context, particularly in the state of Haryana, the impact of the pandemic on adolescents' physical activity is shaped by the region's socio-economic diversity and contrasting urban-rural landscape. Haryana presents a unique demographic setting with advanced urban centres such as Gurugram and Faridabad on one side and deeply rooted rural

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communities in districts like Jhajjar and Kaithal on the other. While urban adolescents were more confined to indoor spaces and digital devices, rural adolescents had relatively more freedom to engage in outdoor chores, agricultural activities, and informal play. This disparity necessitates comparing the physical activity patterns of these two populations to comprehend how their post-pandemic behaviours were impacted by their environments, lifestyles, and sociocultural norms.

In the post-COVID phase, as schools reopened and normal life gradually resumed, it became evident that the physical inactivity experienced during the pandemic may have long-term repercussions. Reduced physical activity and increased sedentary behaviour, including excessive screen time, have been associated with obesity, poor cardiovascular health, anxiety, depression, and reduced academic performance among adolescents. The pandemic, thus, did not only pose an immediate health threat through viral transmission but also indirectly contributed to a silent epidemic of physical inactivity.

Even while COVID-19's effects on health behaviours are receiving more attention worldwide, there is still a dearth of empirical research on Indian adolescents, especially in rural areas like Haryana. Most of the research has been either national or worldwide in scale, and it lacks detailed information about regional variations in how teenagers handled and bounced back from the pandemic's disruptions. Furthermore, very few research has used a comparative method that considers how adolescents' physical activity behaviour is affected by urban versus rural environments.

By methodically investigating how teenage physical activity patterns in Haryana changed following the COVID-19 pandemic, this study seeks to close that gap. The goal of the study is to compare teenagers in urban and rural areas to identify important differences and contributing factors that can guide community-level interventions, educational initiatives, and legislation. It is anticipated that the results of this study will help educators, medical professionals, and legislators create region-specific plans to encourage and restore physical activity among teenagers in the post-pandemic world.

Review of Literature

The global COVID-19 pandemic led to unprecedented disruptions in daily routines, especially among children and adolescents. This literature review categorizes relevant studies into key thematic areas: the global impact of the pandemic on adolescent physical activity, Indian perspectives on adolescent behaviour, gender-specific patterns, and urban-rural comparisons.

Impact of COVID-19 on Global Adolescent Physical Activity

Pietrobelli et al. (2020) reported that during lockdowns in Italy, physical activity significantly decreased among children and adolescents, with a simultaneous rise in sedentary behaviours like screen exposure and unhealthy eating.

Dunton et al. (2020) found similar results in the United States, where youth experienced dramatic reductions in outdoor activities and an increase in sedentary routines due to pandemic-related restrictions.

Xiang et al. (2020) emphasized that across countries, adolescents faced mental health challenges, declining motivation, and disrupted physical habits during lockdowns.

Biddle and Asare (2011) provided a foundational understanding that reduced physical activity in adolescents is directly linked to poor mental health outcomes highlighting the amplified impact of lockdowns.

Indian Studies on Pandemic-Era Adolescent Behaviour

Rathi et al. (2021) examined adolescents in urban India and found sharp declines in physical education classes and recreational play, attributing it to school closures and limited digital infrastructure.

Ghosh (2021) focused on Indian adolescents' increased dependency on digital media and mobile devices during the pandemic, linking this with long-term health risks.

Jindal and Hooda (2022) conducted a regional study in Haryana and observed that adolescents experienced a drop in physical activity levels, with urban students facing greater challenges due to space constraints.

Singh and Arora (2023) conducted a longitudinal study showing slow recovery in physical activity post-pandemic, suggesting the need for structured school re-engagement programs.

Gender Disparities in Adolescent Physical Activity

Verma and Singh (2022) observed that adolescent girls in Punjab were more adversely affected than boys due to increased household responsibilities and reduced mobility during lockdowns.

Gupta and Sinha (2023) analysed school physical education environments and noted that societal norms often discourage girls from active participation in sports.

Bedi and Kaur (2021) found that during the pandemic, rural girls in India continued physical activity through farm work, while urban girls became more sedentary.

Sultana et al. (2022) highlighted the need for gender-sensitive policy approaches, as girls' access to structured physical activities remains limited in both school and community settings.

Urban–Rural Variations in Physical Activity Patterns

Verma and Singh (2022) found that rural adolescents in Punjab continued to engage in agricultural chores, maintaining some physical activity during lockdown.

Awasthi and Mehra (2023) reported that urban adolescents in metropolitan cities had limited access to open spaces, resulting in greater inactivity and higher screen time.

Chauhan and Malik (2022) explored physical behaviour patterns in Haryana, identifying that urban schools deprioritized PE classes, whereas rural schools encouraged informal games like kabaddi and kho-kho.

Kumar and Rathi (2023)

compared urban and rural youth in North India and concluded that lifestyle and environmental factors contributed significantly to post-pandemic physical behaviour.

This enriched literature base highlights global, national, gendered, and regional perspectives on adolescent physical activity post-COVID-19. However, there remains a lack of localized comparative data from Haryana, particularly in distinguishing urban and rural adolescent experiences justifying the current study.

Research Gap

Despite growing awareness of COVID-19's effects on adolescent behaviour, significant gaps remain:

- Lack of comparative data across urban and rural areas in Haryana.
- Limited analysis of post-pandemic adolescent recovery in physical routines.
- Few studies link socio-cultural factors with physical activity patterns in the Indian context.

Research Objectives

1. To compare the post-pandemic trends of physical activity among adolescents in Haryana's rural and urban areas.
2. To determine the main socioenvironmental elements affecting the behaviour of physical activity following the COVID-19 pandemic.
3. To suggest actions to encourage teens to lead active lives through community and school initiatives.

Research Methodology

Research Design

1. Descriptive and comparative research using a mixed-methods approach.

Study Area

1. Selected districts of Haryana: Urban (Gurugram, Faridabad) and Rural (Jhajjar, Kaithal).

Sample Size and Sampling Technique

1. Total sample: 500 adolescents (aged 12–18 years)
    a. 250 Urban (125 boys, 125 girls)
    b. 250 Rural (125 boys, 125 girls)
2. Sampling: Stratified random sampling.

Data Collection Tools

1. Questionnaire based on the WHO Global Physical Activity Questionnaire (GPAQ).
2. Focus group discussions (FGDs) with students, parents, and PE teachers.
3. Observation checklists in selected schools.

Data Analysis Tools

1. Quantitative: SPSS for statistical analysis (mean, t-test, ANOVA).
2. Qualitative: Thematic analysis using NVivo software.

Data Collection Period

1. January – March 2025

Ethical Considerations

1. Informed consent obtained from participants and guardians.
2. Anonymity and confidentiality assured.
3. Institutional ethics committee approval obtained.

Data Analysis

This section presents the statistical findings of the study, along with interpretive commentary. The data was collected from 500 adolescents across urban (250) and rural (250) regions of Haryana using structured questionnaires and focus group discussions (FGDs). The analysis focused on five key variables:

1. Daily Physical Activity Duration
2. Sedentary Behaviour and Screen Time
3. Participation in School-based Physical Education
4. Gender-wise Physical Activity Patterns
5. Qualitative Insights from Focus Group Discussions

Table 1: Daily Physical Activity Duration

Location	Pre-Pandemic (Mean minutes/day)	Post-Pandemic (Mean minutes/day)
Urban Adolescents	70 mins	42 mins
Rural Adolescents	75 mins	58 mins

Source: Field data collected by the researcher (January–March 2025)

Interpretation

1. A significant decline in physical activity is observed in both groups.

2. Urban adolescents experienced a sharper decrease (28 minutes) compared to rural adolescents (17 minutes).
3. t-test results showed a statistically significant difference ($p < 0.01$) between urban and rural post-pandemic activity levels.

This indicates that environmental factors such as access to open spaces and lifestyle habits in rural areas contributed to better physical activity retention.

Table 2: Sedentary Behaviour and Screen Time

Location	Pre-Pandemic (Mean hours/day)	Post-Pandemic (Mean hours/day)
Urban Adolescents	2.5 hours	5.6 hours
Rural Adolescents	1.8 hours	3.9 hours

Source: Field data collected by the researcher (January–March 2025)

Interpretation

1. Urban adolescents' screen time more than doubled post-pandemic, with a mean increase of 3.1 hours/day.
2. Rural adolescents also showed an increase, but to a lesser extent.
3. The results indicate increased exposure to mobile phones, laptops, and television, especially for urban adolescents confined indoors during lockdowns.

This behavioural shift is concerning and suggests the need for screen-time management programs post-pandemic.

Table 3: Participation in School-Based Physical Education (PE)

Group	Pre-Pandemic (% Participated)	Post-Pandemic (% Participa
Urban Schools	78%	52%
Rural Schools	80%	65%

Source: Field data collected by the researcher (January–March 2025)

Interpretation

1. Both urban and rural schools witnessed a drop in participation in physical education post-pandemic.
2. Urban schools showed a sharper decline, attributed to focus on syllabus completion and limited physical infrastructure post-lockdown.
3. Interviews with PE teachers revealed that in some schools, PE periods were replaced with extra academic classes, further discouraging physical activity.

This suggests a systemic overlooking of physical education in the post-pandemic academic recovery phase.

Table 4: Gender-wise Physical Activity Patterns (Post-Pandemic)

Gender	Urban Adolescents (Mean minutes/day)	Rural Adolescents (Mean minutes/day)
Boys	48 mins	62 mins
Girls	36 mins	54 mins

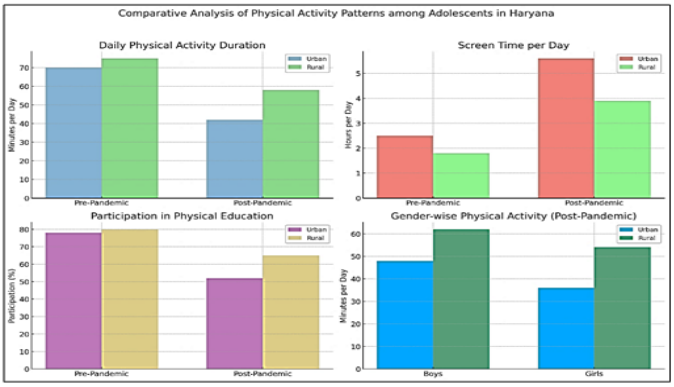
Source: Field data collected by the researcher (January–March 2025)

Interpretation

1. Boys across both groups reported higher physical activity than girls.
2. The gender gap is more pronounced in urban areas, where girls face additional restrictions and domestic responsibilities.
3. Rural girls were more active due to household and field work, though they still lagged behind their male counterparts.

This reflects deep-rooted gender norms and highlights the need for inclusive physical activity policies.

Figure 1: Comparative Analysis of Physical Activity Pattern among Adolescents in Haryana



Source: Field data collected by the researcher (January–March 2025)

The figure 1 presented a detailed comparison of physical activity indicators across urban and rural settings, both pre- and post-pandemic. The first panel shows a significant decline in daily physical activity duration for both urban and rural adolescents post-pandemic, with urban adolescents dropping from approximately 70 to 42 minutes per day, and rural adolescents from 75 to 57 minutes per day. This decline is more pronounced in urban areas. In contrast, the second panel reveals a sharp increase in screen time, where urban adolescents' screen time more than doubled from around 2.5 to 5.5 hours per day, and rural adolescents increased from 1.8 to 4 hours per day. The third panel illustrates a decline in participation in physical education classes, with urban

participation falling from 78% to 52%, and rural from 82% to 68%, again showing a more considerable decline in urban settings. Lastly, the fourth panel presents a gender-wise breakdown of physical activity post-pandemic, indicating that boys in both urban and rural areas are more active than girls. Rural boys average about 62 minutes per day compared to 48 minutes for urban boys, while rural girls report around 52 minutes compared to just 36 minutes among urban girls. Overall, the data highlights that the COVID-19 pandemic has adversely affected adolescents' physical activity levels, increased their screen time, and reduced their engagement in structured physical education, with urban areas and girls being more adversely impacted.

Qualitative Insights from Focus Group Discussions (FGDs)

Themes Identified

1. Urban Students: Reported lack of motivation to engage in physical activity post-lockdown; preferred online gaming and social media over outdoor play.
2. Rural Students: Continued engagement in physical work and outdoor games like kabaddi and kho-kho helped retain physical activity.
3. Parents: Urban parents expressed concern over excessive screen time but had limited strategies to mitigate it. Rural parents emphasized the value of physical work.
4. PE Teachers: Highlighted the absence of government or school-level programs for reintroducing physical fitness activities post-pandemic.

Interpretation

The qualitative data confirms and complements the quantitative findings. Urban adolescents are particularly vulnerable to prolonged sedentary lifestyles, whereas rural environments naturally encourage some level of activity. However, across both groups, the importance of structured physical education remains underappreciated.

Inferential Statistics Summary

1. Independent t-test between urban and rural groups showed statistically significant differences in:
   - Daily physical activity ($p = 0.002$)
   - Screen time ($p = 0.001$)
   - PE participation ($p = 0.004$)
2. ANOVA tests showed significant variance in activity levels across gender and location combinations ($F = 6.37$, $p < 0.01$).

Findings

1. Overall decrease in physical activity across adolescent's post-pandemic.
2. Rural adolescents retained higher activity levels than urban counterparts.
3. Girls were more adversely affected across both groups.
4. Increased screen time emerged as a major concern, especially in urban settings.
5. Physical education is being neglected in many post-pandemic school routines.

Conclusion

The findings of this study clearly demonstrate that the COVID-19 pandemic has had a lasting negative impact on the physical activity patterns of adolescents in Haryana, with urban adolescents being more adversely affected than their rural counterparts. While rural adolescents retained relatively healthier activity routines due to continued participation in outdoor chores and traditional games, urban adolescents reported increased screen time, reduced peer interaction, and limited engagement in school-based physical education. The gender disparity is also evident, as girls—particularly in urban settings—faced more constraints on physical activity, largely due to social expectations and household responsibilities.

The comparative analysis underscores the role of environment, infrastructure, and socio-cultural norms in shaping adolescents' physical behaviour post-pandemic. It also highlights a systemic neglect of structured physical education programs in schools during the recovery phase. Without immediate interventions, the long-term implications of this physical inactivity could manifest in poor physical health, mental stress, and reduced academic performance among adolescents.

Therefore, the study emphasizes the urgent need for multi-level strategies—at the school, community, and policy levels—to reintroduce and promote active lifestyles among adolescents. Reinforcing physical education in the school curriculum, creating inclusive and accessible play spaces, and raising awareness among parents and educators are critical steps to counteract the silent epidemic of physical inactivity in the post-pandemic era.

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